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EFFECT OF FEEDING SOLVENT EXTRACTED AND DETOXIFIED KARANJ (*PONGAMIA GLABRA VENT*) CAKE ON EGG QUALITY PARAMETERS IN COMMERCIAL LAYER CHICKEN

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ABSTRACT

Owing to lack of rainfall and higher global rates, there is a shortage of poultry industry conventional feeds. In this situation, there is a great need to look for other alternative feed resources. An experiment was carried out in order to find out the feasibilty of feeding karanj (pongamia glabra vent) cake to White Leghorn Layer Chicken by using detoxified karanj cakes. The results revealed that, the egg quality and shell quality parameters observed in the study were well within the standard values and unaffected significantly (P<0.05) either by the type of karanj cake or levels of inclusion indicating that there were no deleterious effects at the level upto 10% in comparison to control.

KEYWORDS: White Leghorn Layer Chicken, Karanj Cake, Egg Quality and Shell Quality Parameters

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Original Article

INTRODUCTION

Karanj cake is rich in protein and was advocated for incorporation in various types of poultry rations at very low levels (Krishna Daida, 2013). The availability of karanj seed in India is 2, 00, 000 metric tonnes per year (Anon, 2012). Recent study revealed that alkali treatment with NaOH or Ca (OH)2 of karanj cake reduced the karanjin content substantially (Panda *et al*., 2006). The present study was therefore, conducted to see the effect of dietary incorporation of solvent extracted karanj cake and detoxified karanj cake on egg quality and shell quality parameters in layer chicken.

MATERIALS AND METHODS

To evaluate the effect of dietary incorporation of solvent extracted karanj cake (SKC) and detoxified karanj cake wth 2 % NaOH (w/w) the detoxified karanj cake was included at 10% level in commercial layer chicken (*Lohmann*) diet an *isocaloric* and *isonitrogenous* basis. A total of 216 commercial layers at the age of 45 weeks were procured, leg banded and weighed individually. Six replicates were allocated to each of the treatments (9), employing four birds / replicate. The experiment was conducted in 3 laying periods, viz. first period (45- 48 weeks), second period (49-52 weeks) and third period (53 -56 weeks). At the end of each period, eggs were collected in 3 consecutive days for evaluating egg quality parameters.

Internal egg quality parameters were recorded at each laying period from the eggs laid by a bird consecutively for three days. Totally 18 eggs per treatment were utilized for measurement of egg quality traits viz., egg weight, egg width, egg length, shell weight, shell thickness, albumen weight, albumen length, albumen width, albumen height, albumen index (Heiman and Carver, 1936) yolk weight, yolk diameter, yolk height, yolk colour and Yolk index (Funk, 1948).

The weight of each egg was recorded with electronic digital balance to the accuracy of 0.1 g. The longer and wider diameter of the egg was measured using vernier calipers with an accuracy of 0.05 mm. The shells of the broken eggs were cleaned and allowed to dry at room temperature. The shell weight (dried) was measured up to 0.1 g accuracy. Albumen weight was calculated indirectly by subtracting the weights of the yolk and shell from the egg weight. The weights of albumen, yolk and shell were calculated in relation to egg weight and expressed as percentage.

RESULTS AND DISCUSSIONS

The hen day egg production value ranged from 88.04 to 83.43% and there was no significant difference compared to control (87.89%). Egg mass was not significantly ($P>0.05$) affected by 10% level of raw or processed SKC with supplementation of enzyme or liver tonic during first period (45 – 48 weeks), second period (49 – 52 weeks) and third period (53 – 56 weeks). However, during third period (53 – 56 weeks), a higher ($P<0.05$) egg mass was observed in control group with or without supplementation of protease or liver tonic was comparable.

Similar to the findings of this study, Krishna daida (2013) observed that inclusion of karanj cake at 6 percent level did not affect hen day egg production and egg mass.

The mean egg weight was not significantly ($P>0.05$) influenced by processed or unprocessed karanj cakes. The values for different types ranged between 55.55 to 58.96g than control diet (57.65g). Shape index was not significantly ($P>0.05$) affected by 10% inclusion of SKC, NaOH treated SKC and control with or without supplementation of enzyme or liver tonic.

Similar to the findings of this study, Mandal and Banerjee (1981) also observed that inclusion of karanj cake at 10 percent level did not affect egg weight. However, the egg weights were affected adversely at 15% karanj cake in the diet.

Albumen quality evaluated as albumen index, albumen weight, albumen percentage and haugh unit score were not significantly influenced among the different dietary groups. The values for all the above parameters were found to be in their normal range. The effect of different periods was also not significant for albumen index, albumen weight, albumen percentage and haugh unit score. Krishna Daida (2013) reported that, all the albumen quality parameters for different treatments (NaOH, NaOH & HCl and Ca(OH)2) of SKC and untreated SKC were not significantly different in layer birds during 26 – 37 weeks of age.

The yolk quality evaluated as yolk color, yolk index, yolk weight and yolk percentage was not influenced except the yolk color, which was significantly affected during third period, this might be due to hepatotoxicity of antinutritional factors like karanjin, tannins, trypsin inhibitors etc.

Yolk index, yolk weight, yolk width and yolk colour were within the normal range and were similar among the treatment groups. Krishna Daida (2013) reported that, all the yolk quality parameters for different treatments (NaOH, NaOH & HCl and Ca(OH)2) of SKC and untreated SKC were not significantly different in fed layer birds during 26 – 37 weeks of age.

The effect of different periods was not significant on shell thickness and percentage of shell. The values for all the above parameters were found to be in the normal range.

Similarly, Mandal and Banerjee (1981) observed no significant differences in egg quality traits for both 10% and 15% levels of karanj cake in layer diet. Krishna Daida (2013) reported that, all the shell quality parameters were found in

the normal range for different treatments (NaOH, NaOH & HCl and $Ca(OH)_2$) of SKC and untreated SKC were not significantly different in layer birds during 26 – 37 weeks of age.

This suggests that the processed and unprocessed karanj cake supplementation in the commercial layer chicken diet did not adversely affect the egg quality parameters. It might be due to that birds could sustain upto 10 percent SKC safely or chemical treatment employed in SKC which could have prevented the undesirable effects of deleterious factors if any in the karanj cake. Similarly Mandal and Banerjee (1981) observed no significant differences in egg quality traits for both 10 and 15% levels of karanj cake in layer diet.

CONCLUSIONS

Inclusion of SKC did not affect egg mass and egg weight with the values following normal physiological curve and egg quality traits like haugh unit score, albumen index, yolk index, shell thickness and percentage of shell were well with in the standard values and unaffected. These results suggest that untreated SKC can be incorporated upto 10 percent level in the diet of White Leghorn layers.

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APPENDICES

Table 1

Treatment	SKC Level (%)	Albumen index	% of Albumen	Haugh unit score	HDEP (%)	Egg weight (g)	Shape index	Yolk colour	Yolk index	% of Yolk	Shell thickness (mm)	% of Shell
		Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean
Control	-	0.11	64.72	79.66	87.89	57.65	72.62	5.611	0.408	27.27	0.361	8.681
Control + Protease (4000U/kg)	-	0.107	64.68	82	88.03	56.89	73.22	6.333	0.402	27.02	0.366	8.97
Control + Liver Tonic (0.1%)	-	0.103	65.12	81.66	88.04	57.44	73.11	5.445	0.408	26.71	0.363	8.816
SKC	10	0.113	64.38	82.48	83.43	56.62	73.16	4.89	0.413	27.22	0.363	9.103
SKC +Protease (4000U/kg)	10	0.115	65.01	82.76	86.22	57.84	73.69	5	0.42	26.75	0.368	8.911
SKC+ Liver Tonic (0.1%)	10	0.115	63.73	82.01	87.79	55.55	73.41	5.02	0.407	27.57	0.363	9.336
NaOH treated SKC	10	0.111	64.58	83.37	87.55	57.73	73.63	5.258	0.418	27.21	0.365	8.833
NaOH treated SKC+ Protease (4000U/kg)	10	0.114	65.09	83.59	87.81	58.96	73.56	5.091	0.407	26.5	0.365	9.121
NaOH treated SKC + Liver Tonic (0.1%)	10	0.112	64.31	84.03	87.95	56.38	74.17	5.148	0.415	27.47	0.358	8.873
n		6	6	6	6	6	6	6	6	6	6	6
P value		0.271	0.968	0.095	0.986	0.074	0.826	0.056	0.763	0.506	0.52	0.077
SEM		0.001	0.263	0.338	1.015	0.252	0.193	0.11	0.003	0.124	0.001	0.05